



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,408	07/07/2006	Toshihisa Nozawa	33082M335	2529
441 7590 07/21/2009 SMITH, GAMBRELL & RUSSELL 1130 CONNECTICUT AVENUE, N.W., SUITE 1130 WASHINGTON, DC 20036				
EXAMINER				
CHEN, KEATH T				
ART UNIT		PAPER NUMBER		
1792				
MAIL DATE		DELIVERY MODE		
07/21/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/585,408

**Applicant(s)**

NOZAWA ET AL.

**Examiner**

KEATH T. CHEN

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-5 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-5 and 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/19/2009 has been entered.

### ***Response to Amendment***

1. The claim amendment filed on 06/19/2009, addressing claims 2-5, 8, and 10 rejection from the final office action (12/23/2008) by amending claims 2 and 10 and canceling claim 8 is entered, and will be addressed below.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

2. **Claims 10 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenji (JP 02-055292, hereafter '292), in view of Amai (US 20030034056, hereafter '056) and Kitano et al. (US 5944894, hereafter '894).**

'292 teaches some limitations of:

Claim 10: A substrate processing apparatus (Fig. 1) for processing a substrate (#3, Fig. 3, part that being omitted in Fig. 1) for manufacturing a semiconductor device, comprising an object (1A, reactor wall) to be cooled (English abstract, Constitution, lines

5-11), the apparatus further comprising: a mist generator (water #11, ultrasonic vibrator #13 and #12 container) that generates a mist (droplet #11A, line 11); a carrier-gas (#14) supply source that supplies a carrier gas for carrying the mist generated in the mist generator; and a mist passage (double wall between outlet tube #6 and inner wall #1, line 7) through which the mist carried by the carrier gas flows to cool the object. (original claim 1).

'292 does not teach the other limitations of:

Claim 10: a gas-liquid separator that separates the mist circulated in the mist passage from the carrier gas, and collects the separated mist as a liquid, the gas-liquid separator has a plurality of fins to form a meandering passage, and wherein the mist generator generates the mist from the liquid collected by the separator.

'056 is an analogous art in the field of semiconductor processing (field of the invention), particularly in recovering the cleanness of the processing liquid for reuse ([0004], last sentence). '056 teaches mist-trap/gas-liquid separator (#132, Fig. 5, [0087]) and then reused (through pipe #134 and recovery path #137, [0111]).

'894 is an analogous art in the field of semiconductor treatment (field of the invention), particularly in mist trap mechanism to separate gas liquid (col. 2, lines 4-8). '894 teaches an eliminator/separator (#291, Fig. 11, col. 13, lines 19-27) with multi-stage fins (#291a) zigzag/meandering arranged so that mist collides with fins to separate liquid and gas.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add a mist trap/gas-liquid separator, as taught by '056, to the apparatus in Fig. 1 of '292, for the purpose of recovering the clean liquid, as taught by '056 ([0004]); and to have adopted the eliminator/separator with zigzag/meandering fins, as taught by '894, for the purpose of efficient trap mist and/or suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. MPEP 2144.07.

'292 further teaches the limitations of:

Claim 2: The substrate processing apparatus according to claim 10, wherein the object is at least a part of a processing vessel (reaction vessel #7, line 12 of English abstract) in which a substrate received (#3, Fig. 3, part that being omitted in Fig. 1) therein is processed.

**3. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over '292, '056, and '894, further in view of Hiroyuki et al. (JP 2001-156047, hereafter '047).**

'292, '056, and '894, together, teach all limitations of claim 2, as discussed above. '292 further teaches the limitations of:

Claim 4: The substrate processing apparatus according to claim 3, further comprising a heater (high frequency power heater #5, Fig. 3, part that being omitted in Fig. 1, last paragraph of the upper left panel of page 2) that heats the object, at least

when no plasma is generated (when to use heater or not is intended use of the apparatus).

'292 does not explicitly teaches the limitations of:

Claim 3: The substrate processing apparatus according to claim 2, wherein the substrate is processed in the processing vessel with the use of a plasma.

Claim 5: The substrate processing apparatus according to claim 2, further comprising a heating furnace that receives the processing vessel, wherein the mist passage is formed as a space defined between the processing vessel and the furnace.

'047 is an analogous art in the field of semiconductor manufacturing device, particularly in cooling body of a reaction chamber (English translation, [0001] field of the invention). '047 teaches a plasma ([0002], line 3, and the HF source at the bottom of Fig. 1) reaction chamber (#13, [0015], line 4) with nozzle (#19) to supply liquid refrigerant to the cooling passage/double wall ([0016]) between #13 and #13a in a misty state. '047 further teaches the outer wall embeds heating means ([0021]); therefore, outer wall #13 is a heating furnace that receives the processing vessel with mist passage in between the processing vessel and the furnace. '047 is silent on the details of the mist generation apparatus.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added a heating furnace and arranged cooling passage

between the double wall, as taught in Fig. 1 of '047, to the combined apparatus of '292, '056, and '894.

The motivation to add a heating furnace and arrange cooling passage between the double wall is suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

### ***Response to Arguments***

Applicant's arguments filed on 06/19/2009 have been fully considered but they are not convincing in light of the new grounds of rejection above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on 6:30AM-3 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./  
Examiner, Art Unit 1792  
/Ram N Kackar/  
Primary Examiner, Art Unit 1792